

### ABSTRACT

Radiation-activated catalysts (RACs), autocatalytic reactions, and protective groups are employed to achieve a highly sensitive, high resolution, radiation directed combinatorial synthesis of pattern arrays of diverse polymers. When irradiated, RACs produce catalysts that can react with enhancers, such as those involved in autocatalytic reactions. The autocatalytic reactions produce at least one product that removes protecting groups from synthesis intermediates. This invention has a wide variety of applications and is particularly useful for the solid phase combinatorial synthesis of polymers.